a vacuum pump connected with the two adsorption columns that desorbs and discharges residue adsorbed by the adsorption columns to regenerate the adsorbent; and

said air blower, two adsorption columns, surge tank and vacuum pump are connected and controlled through a piping and valve system;

C1 cont.

wherein the adsorption columns are formed such that a superficial velocity u [m/s] is set to be within a range of ±25% of $u = 0.07a + 0.095$, wherein "a" [mm] being the diameter of the adsorbent in case of said particles of said adsorbent having a spherical shape, or an equivalent diameter in case of said particles of said adsorbent having a cylindrical shape, an elliptic spherical shape or an elliptic cylindrical shape.

C2

12. (Amended) A pressure swing adsorption separation system, comprising: the adsorption column apparatus according to claim 6.
